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Oral talk

PHENIX MEASUREMENTS OF REACTION PLANE DEPENDENCE OF HIGH P_T PHOTONS AND PIONS IN Au+Au COLLISIONS

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The study of high p_T particle production at RHIC is one of the major experimental tools to investigate high-density state formed in the relativistic heavy ion collisions. This process is often called 'jet tomography'. The nuclear modification factor, R_{AA}, which is used to quantify nuclear suppression, was successfully described by a variety of models with very different initial assumptions. Extraction of the jet energy loss information from inclusive R_{AA} is complicated because R_{AA} is a convolution of medium density, collision geometry and energy loss of high p_T partons. Large azimuthal anisotropy, v_2, in particle yields at p_T above 5 GeV/c remains a puzzling result as a significant flow contribution at such a high momentum is unlikely. On the other hand, traditional parton energy loss models give systematically smaller value of v_2.

In contrast to the inclusive R_{AA}, measurement of R_{AA} versus the reaction plane is a tool to change geometry keeping the same density profile. Such measurement is more informative than v_2, the latter one is the amplitude of R_{AA} variation versus the angle in the reaction plane.

It is useful to combine information extracted from hadron production with electromagnetic signals, like direct photons. Hard photons from early stage of the collisions along with negligible photon interaction probability imply that the direct photon v2 should be zero. However, direct photons can also be created as final processes in medium with both positive and negative contributions to the photon v2. Thus, the measurement of direct photon v_2 may constrain different model predictions.

In this talk we present PHENIX results on π^0 production with respect to the reaction plane. Such results will put strong restrictions on the parton energy loss parameters. Measurements of R_{AA} in reaction plane and particle anisotropy in a wide range of p_T provide insights on the transition from soft to hard regions. We will also present recent high statistics results on direct photon v_2 at high p_T. Various energy loss models will be compared with the data.